MRCE
built on firm foundations

April 3, 2018

Honeywell
115 Tabor Road
Morris Plains, NJ 07950

Attn: Mr. William Hague

Re: Foundation Construction through ISS
Quanta Site Redevelopment
Edgewater, NJ
MRCE File 12930

Dear Mr. Hague:

Proposed re-development of the 115-145 River Road (former Quanta Resources Corporation) site will include construction of high-rise buildings over garage space with a multi-story podium/garage connecting the high-rise structures. In some areas foundation elements for the proposed buildings must extend through solidified in-situ stabilized (ISS) material to reach suitable bearing strata.

The September 2011 US EPA Record of Decision (ROD) requires foundation construction through ISS "take place in such a way that it does not compromise the long-term protectiveness of the remedy, does not exacerbate or spread residual contamination at the site, and requires prior review and approval from the Agency."

This document describes proposed foundation construction processes to meet the ROD requirements noted above.

A. CONCEPTUAL REDEVELOPMENT SCHEME

The current redevelopment scheme is shown conceptually in Figure 1. Portions of planned high-rise and low-rise structures overlie ISS areas.

Where possible, ISS spoils will be managed so that the final surface of ISS is at or below the planned bottom of the Podium floor slab and Tower pile caps, to reduce future management of solidified ISS material during redevelopment construction. A layer of crushed concrete or gravel aggregate material approximately 4 inches (minimum) thick will be placed over the finished top of ISS, to the extent necessary, to provide a working surface for construction equipment, to protect the ISS from disturbance, and for dust control.

Subgrade below the Tower pile caps will be several feet lower than subgrade below the podium floor slab. Accordingly, the finished top of ISS will be managed to create a lower area at each tower footprint. Local ISS removal for pile caps, elevator pits, and utility corridors will also be required.

Figure 2 is a schematic cross-section that summarizes concepts for foundation construction through ISS material. Construction processes for individual foundation elements are described below.

B. DRIVEN PIPE PILES

Driven closed-end pipe piles with conical tips are proposed for the Podium area and Clubhouse, where re-development loads can be supported on foundations bearing in glacial till or weathered rock strata. The conceptual process for installing driven piles through solidified ISS is illustrated on Figure 3 and summarized below.

1. An oversized hole about 6 inches larger in diameter than the pile diameter will be drilled through ISS material. ISS drill spoils will be collected for incorporation into fresh ISS at other locations on site, or characterized and managed for offsite disposal as may be appropriate.

2. The annulus between the pile and oversized hole will be backfilled with a low-permeability non-shrink sealant (high solids bentonite or cement-bentonite grout) to confine groundwater.

3. Driven piles will be closed-end pipe piles with seal-welded conical tips, filled with concrete. This "displacement" type pile seals with adjacent soil through development of passive pressure during driving. The conical point prevents the pile from dragging shallow soil deeper into the formation, preventing the spread of residual contamination. Driven pipe piles with conical tips have traditionally been accepted as "environmental piles" for use on contaminated sites.

ROD Compliance – Driven Piles:

- Drilling oversized holes mitigates impact driving through ISS.
- Sealed annulus between the ISS and the environmental pile confines groundwater.
- Use of concrete-filled displacement pipe piles ("environmental pile") with conical tips inhibits drag-down of shallow soil and fluid migration along the pile shaft.

C. SOCKETED DRILLED SHAFTS

To support high vertical and horizontal structure loads below the four towers, socketed drilled shafts are planned consisting of series of concrete- or grout-filled permanent steel casings that seal with the top of rock, and uncased rock sockets below the casings. The conceptual process for installing socketed drilled shafts through solidified ISS is illustrated on Figure 4 and summarized below.

1. Permanent casing with teeth will be advanced using drilling methods that cut the ISS material. Spoils and groundwater removed from within the casing will be collected and managed for disposal off site. If appropriate, ISS spoils will be collected for incorporation into fresh ISS at other locations on site.

2. After the permanent casing is seated in rock, an uncased rock socket will be advanced to final depth using an auger or down-hole-hammer. The rock socket and casing will be filled with structural concrete.

3. A low-permeability seepage collar (high-solids non-shrink bentonite or self-hardening cement-bentonite grout) will be placed around the permanent casing at the ISS surface to seal against upwelling.

ROD Compliance – Socketed Drilled Shafts:

- Casing advance by drilling cuts through ISS to protect the integrity of ISS mass.
- Use of casing and drilling methods with spoils collection mitigates migration of contamination during drilled shaft installation.
- Seepage collar between the ISS and casing abates groundwater upwelling.

D. PILE CAPS, ELEVATOR PITS, AND UTILITIES

Where possible, ISS spoils will be managed so that the final surface of ISS is at or below the planned bottom of the Podium floor slab and Tower pile caps, to minimize future management of solidified ISS material during redevelopment construction.

Where necessary, local removal of solidified ISS will be performed at pile caps, elevator pits, and for utility conduits. Construction methods will protect the integrity of the ISS mass (Figures 5a and 5b):

- Conventional earthwork equipment (e.g. backhoes, excavators, etc.) outfitted with the appropriate appurtenances to maintain the integrity of the ISS mass will be used.

Where elevator pits extend below the bottom of ISS material, the following methods will be used (Figure 6):

- Perimeter shoring will be installed beyond the structure limits to support excavation of materials below the ISS mass. Shoring will be installed in a pre-cut and/or drilled trench through the ISS mass. The cut face will be sealed where the ISS mass is penetrated. Methods may include trenching and/or drilling under a slurry of low-permeability soil-bentonite, self-hardening cement-bentonite, or soil mix material.

- Groundwater will be controlled ahead of the excavation. Groundwater will be collected and treated in accordance with disposal and/or discharge requirements. Dewatering sumps or well points will be positioned as required to properly manage the groundwater within the affected work area(s). Perimeter shoring (described above) may be used to provide localized groundwater cutoff in the affected work area(s).

- This shoring described above will be left in place permanently.

Removed ISS material will be collected for incorporation into fresh ISS at other locations on site, or characterized and managed for offsite disposal as may be appropriate.

ROD Compliance – Pile Caps, Elevator Pits, and Utilities:
- ISS material removal methods will protect integrity of ISS mass.
- Excavation shoring, where necessary, protects ISS integrity by retaining soil in place below the ISS mass.
- Pre-trenching or pre-drilling for shoring protects integrity of ISS mass.
- Sealed cut face at shoring perimeter confines groundwater.
- Dewatering methods, where necessary, will properly manage groundwater.

E. DRIVEN PILES AND SOCKETED DRILLED SHAFTS OUTSIDE OF ISS REMEDY AREAS

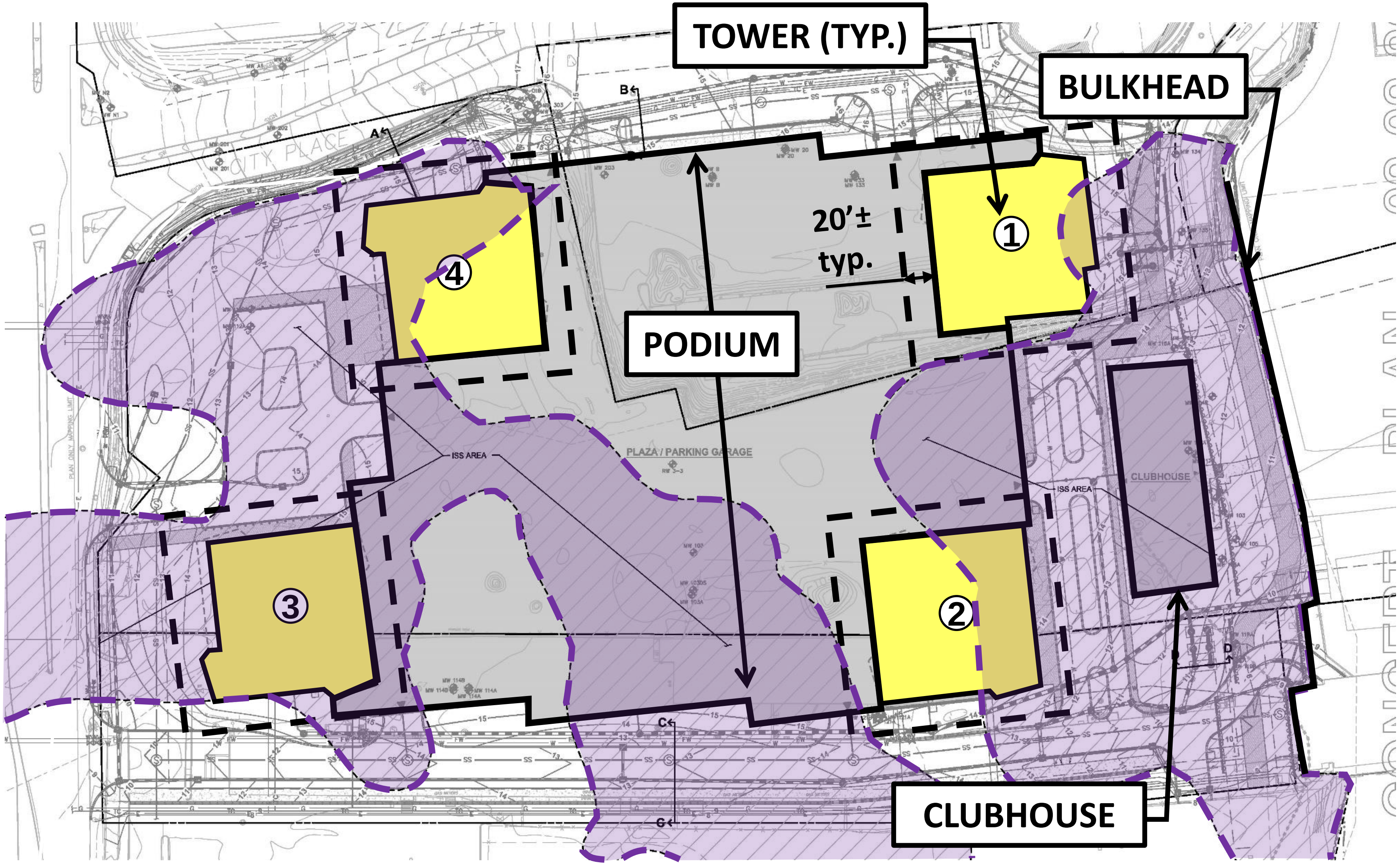
In redevelopment areas that do not overlie the ISS remedy, conventional foundation installation methods may be used. All driven piles at the site shall be concrete-filled pipe piles with conical tips (environmental piles). All spoils removed shall be managed in accordance with prevailing regulatory requirements.

Very truly yours,
MUESER RUTLEDGE CONSULTING ENGINEERS

Peter W. Deming, PE

Cc: Steve Coladonato, Honeywell
John Mojka, Honeywell

Conceptual Redevelopment Scheme



LEGEND

- ISS Area
- Tower footprint
- Equipment access margin at tower perimeter

Note:
ISS areas and planned building locations shown are approximate, for concept illustration only.

FIGURE 1

Foundation Construction through ISS

Schematic Cross Section at Podium and Tower (not to scale)

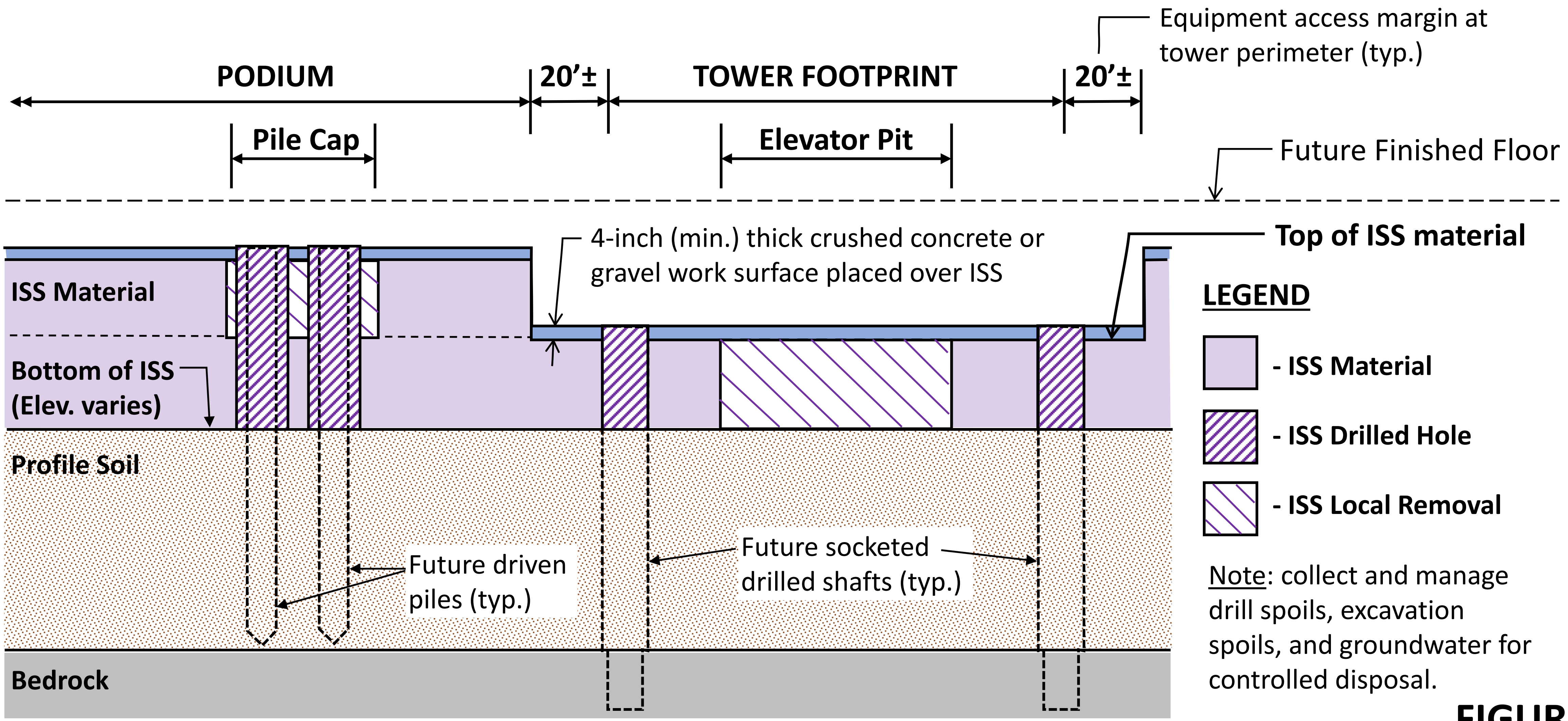


FIGURE 2

Driven Pipe Pile Installation through ISS

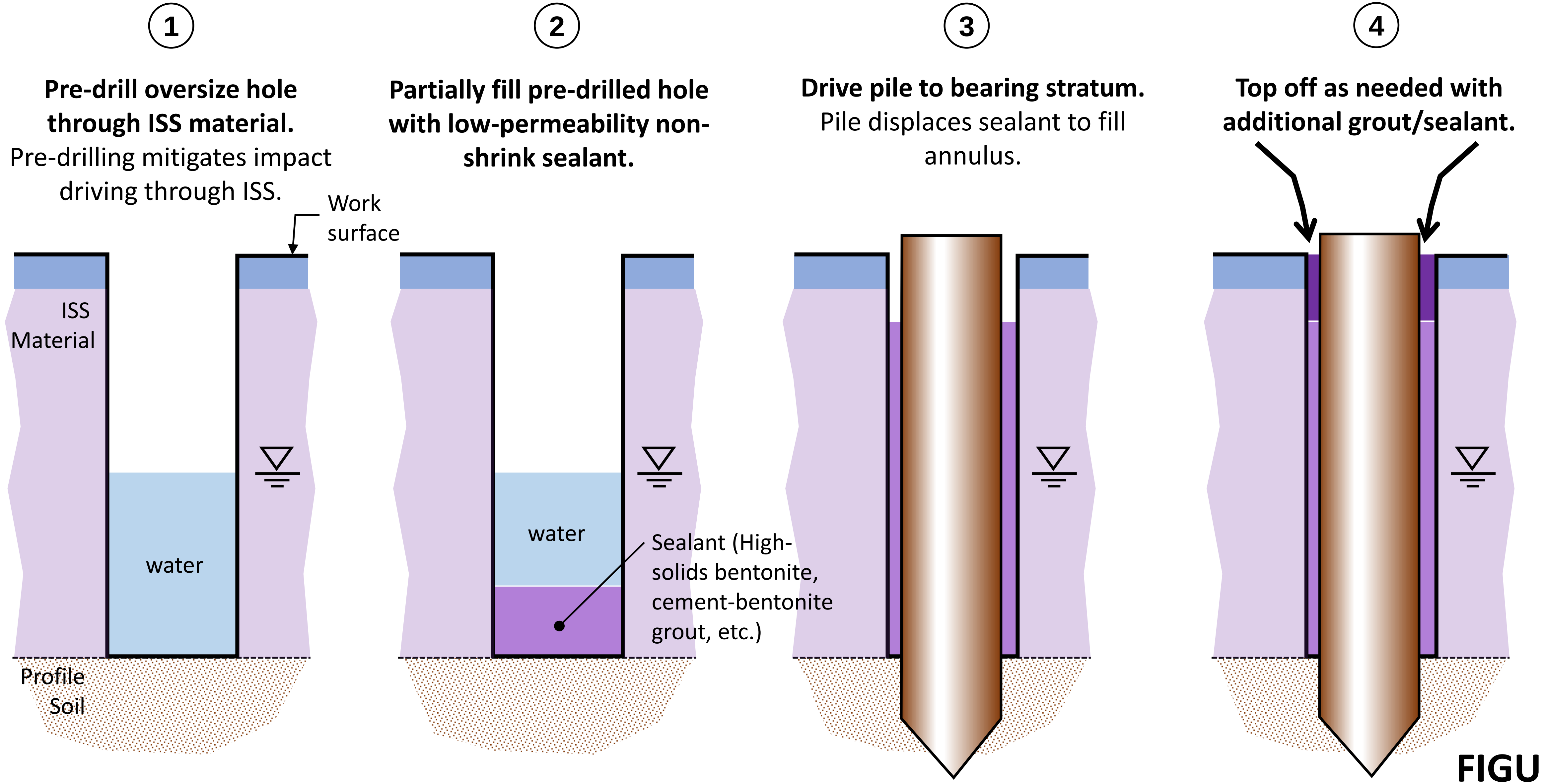


FIGURE 3

Socketed Drilled Shaft Installation through ISS

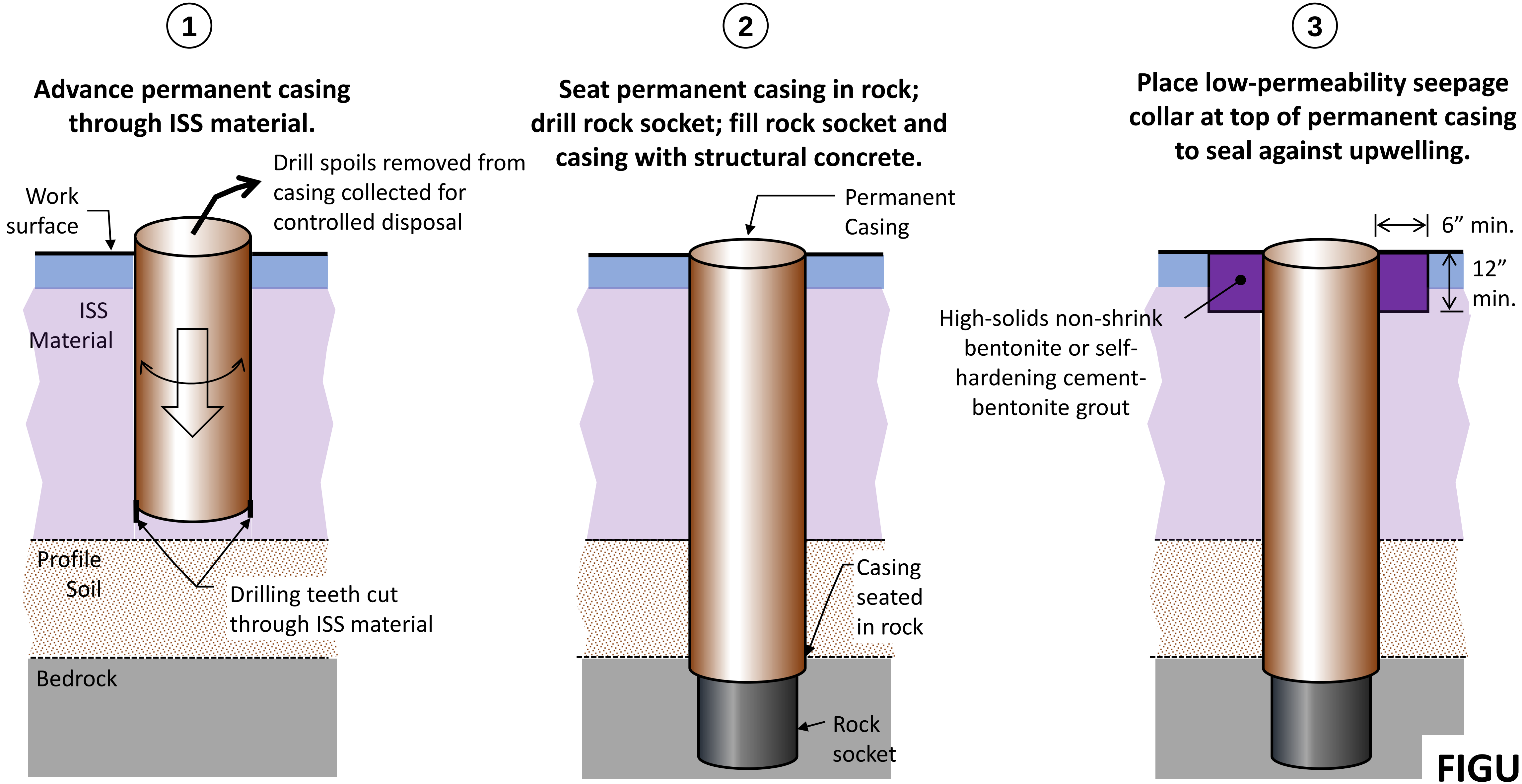
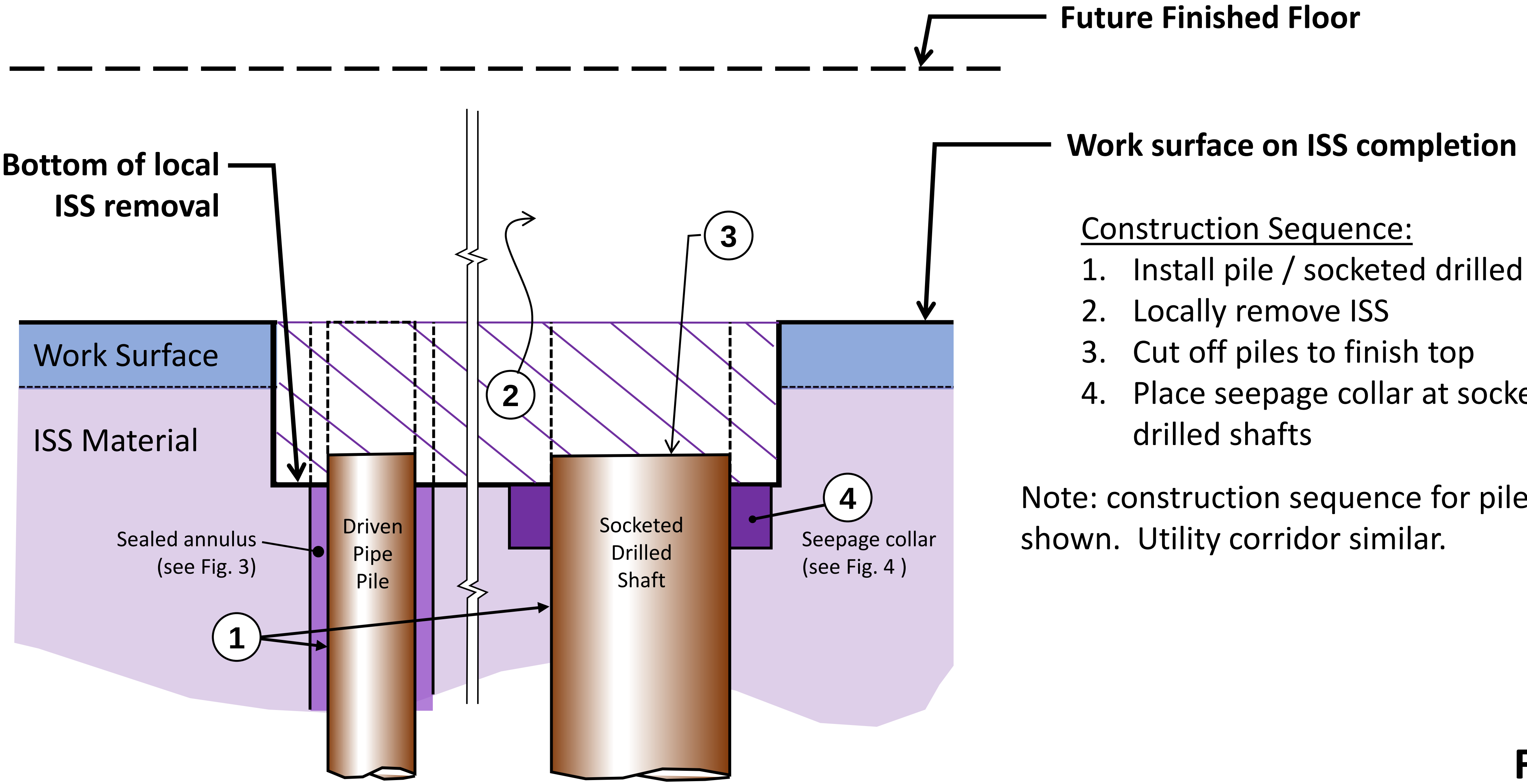


FIGURE 4

Pile Caps and Utilities (1 of 2)



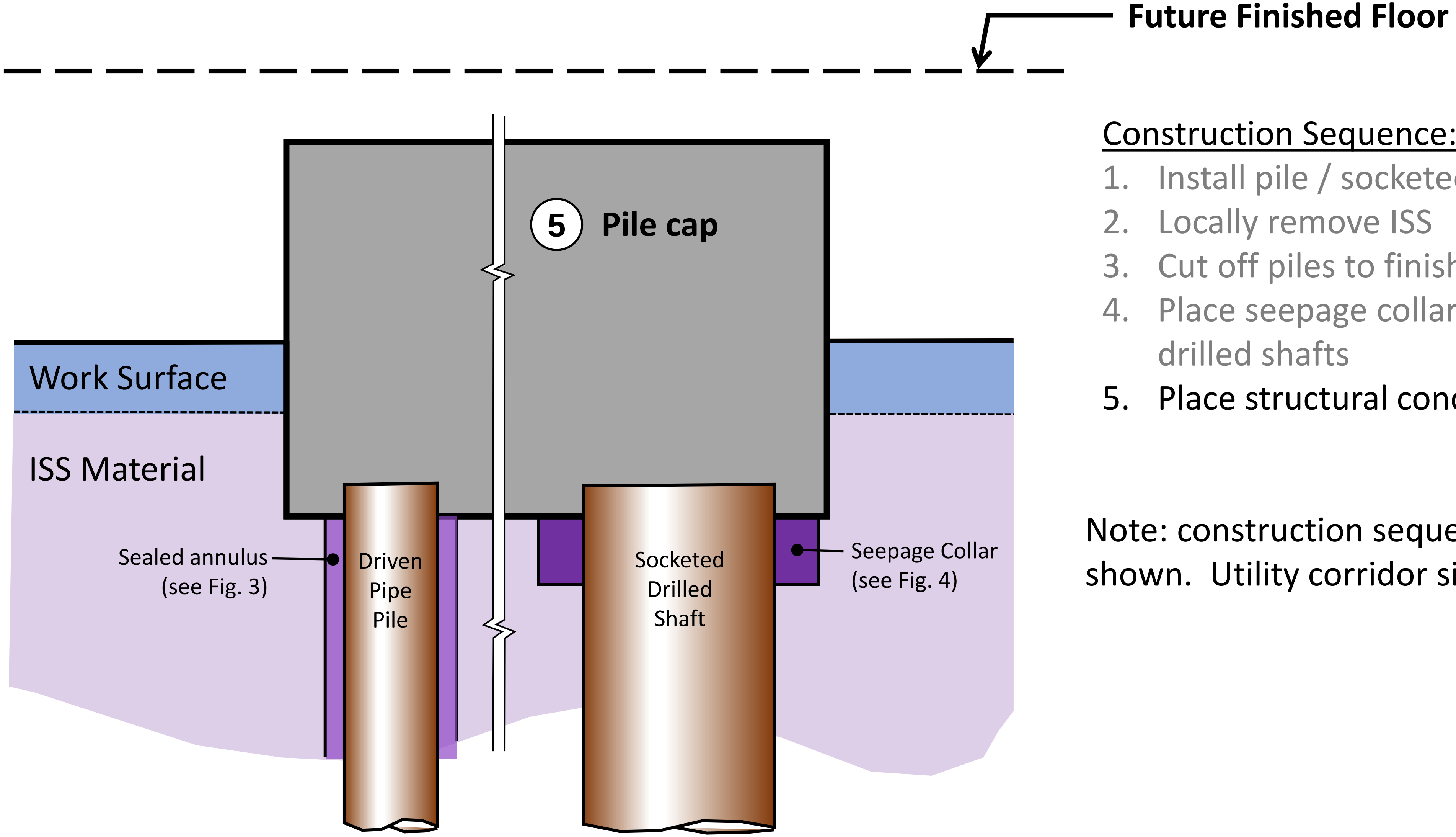
Construction Sequence:

1. Install pile / socketed drilled shaft
2. Locally remove ISS
3. Cut off piles to finish top
4. Place seepage collar at socketed drilled shafts

Note: construction sequence for pile cap shown. Utility corridor similar.

FIGURE 5a

Pile Caps and Utilities (2 of 2)



Construction Sequence:

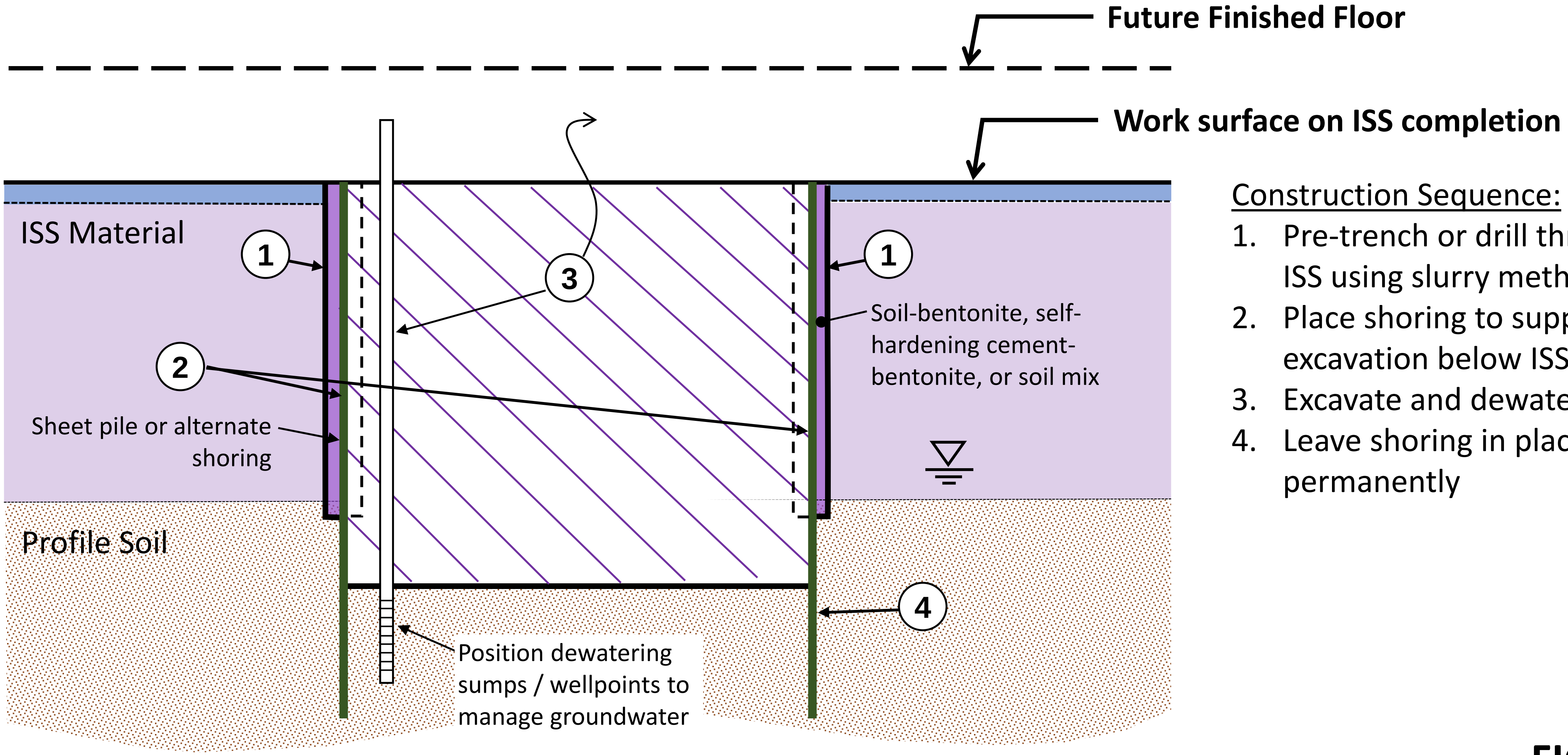
1. Install pile / socketed drilled shaft
2. Locally remove ISS
3. Cut off piles to finish top
4. Place seepage collar at socketed drilled shafts
5. Place structural concrete pile cap

Note: construction sequence for pile cap shown. Utility corridor similar.

FIGURE 5b

Elevator Pits

Extending below bottom of ISS Material



Construction Sequence:

1. Pre-trench or drill through ISS using slurry methods
2. Place shoring to support excavation below ISS
3. Excavate and dewater
4. Leave shoring in place permanently

FIGURE 6